

What is claimed is:

1. A flat type plasma a discharge display device, wherein a discharge sustaining electrode group arranging a plurality of discharge sustaining electrodes and an address electrode group arranging a plurality of address electrodes are formed on a common substrate or on mutually different substrates,

a plurality of plasma discharge parts are formed for one discharge start part of said address electrodes, and

an interval between each pair of discharge sustaining electrodes in discharge sustaining relating to each plasma discharge part is set at less than 50 μm , and a plasma discharge display mainly by a cathode glow discharge is realized.

2. A driving method of a flat type plasma a discharge display device in which a discharge sustaining electrode group arranging a plurality of discharge sustaining electrodes and an address electrode group arranging a plurality of address electrodes are formed on a common substrate or on mutually different substrates, a plurality of plasma discharge parts are formed for one discharge start part of said address electrodes, an interval between each pair of discharge sustaining electrodes in discharge sustaining relating to each plasma discharge part is set at less than 50 μm , and a plasma discharge display mainly

by a cathode glow discharge is realized,

wherein a target or intended display is performed by making a portion between an address electrode of a discharge start part relating to a selected plasma discharge part and a discharge sustaining electrode in a discharge start state.

3. A driving method of a flat type plasma a discharge display device as claimed in claim 2, wherein upon performing the intended display,

as a driving method for forming one screen by first and second fields, in the first field, a display by a part of plasma discharge parts corresponding to each discharge start part is performed, and

in the second field, a display by the other plasma discharge parts corresponding to each discharge start part is performed.

4. A driving method of flat type plasma a discharge display device as claimed in claim 2, wherein upon performing the intended display,

the intended display is made by driving and displaying a plurality of plasma discharge parts corresponding to the discharge start parts simultaneously.

5. A flat type plasma a discharge display device,

wherein a discharge sustaining electrode group arranging a plurality of discharge sustaining electrodes and an address electrode group arranging a plurality of address electrodes individually each having a discharge start address electrode are formed on a common substrate,

said discharge sustaining electrodes and said address electrodes are disposed so as to intersect each other through an insulating layer, and

a plurality of plasma discharge parts are formed for each of said discharge start address electrodes.

6. A flat type plasma a discharge display device as claimed in claim 5, wherein an interval between each pair of discharge sustaining electrodes for composing said plasma discharge part is set at less than 50 μm , and a plasma discharge is mainly done by a cathode glow discharge.

7. A flat type plasma a discharge display device as claimed in claim 5, wherein two sets of said discharge sustaining electrodes for forming two plasma discharge parts are disposed at both sides of each one of said discharge start address electrodes to sandwich the same.

8. A flat type plasma a discharge display device as claimed in claim 5, wherein a partition insulating layer is

disposed between forming parts of the plasma discharge parts positioned between the discharge start address electrodes of mutually adjacent address electrodes.

9. A flat type plasma a discharge display device as claimed in claim 5, wherein a partition insulating layer is disposed between forming parts of the plasma discharge parts positioned between the discharge start address electrodes of mutually adjacent address electrodes, and

a height of said partition insulating layer is set larger than an interval between sets of discharge sustaining electrodes for composing the plasma discharge part.

10. A flat type plasma a discharge display device as claimed in claim 5, wherein a partition insulating layer is disposed between forming parts of the plasma discharge parts positioned between the mutually adjacent discharge start address electrodes, and

said partition insulating layer and an insulating layer existing at an intersection of said discharge sustaining electrode and said address electrode are forming in a lattice pattern on the whole by a common insulating layer.

11. A flat type plasma a discharge display device as claimed in claim 5, wherein three discharge sustaining

electrodes are arranged parallel between mutually adjacent discharge start electrodes, a discharge sustaining electrode positioned at a center of the three discharge sustaining electrodes is used commonly, and two pairs of discharge sustaining electrodes for composing the two plasma discharge parts are composed by combination with the discharge sustaining electrodes positioned at both sides thereof.

12. A flat type plasma a discharge display device as claimed in claim 5, wherein a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween, and peripheral parts of the first and second substrates are sealed air-tightly to compose a flat type display container,

at least one of said first substrate and said second substrate is made of a transparent substrate for transmitting therethrough a display light, and

said first substrate is made as the common substrate on which said discharge sustaining electrode group and said address electrode group are formed.

13. A flat type plasma a discharge display device as claimed in claim 5, wherein a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween, and peripheral parts of the first and

second substrates are sealed air-tightly to compose a flat type display container,

at least one of said first substrate and said second substrate is made of a transparent substrate for transmitting therethrough a display light,

said first substrate is made as the common substrate on which said discharge sustaining electrode group and said address electrode group are formed, and

a fluorescent layer is formed on said second substrate.

14. A flat type plasma a discharge display device as claimed in claim 5, wherein a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween, and peripheral parts of the first and second substrates are sealed air-tightly to compose a flat type display container,

at least one of said first substrate and said second substrate is made of a transparent substrate for transmitting therethrough a display light,

said first substrate is made as the common substrate on which said discharge sustaining electrode group and said address electrode group are formed, and

a partition wall for dividing a unit discharge region is formed on said second substrate.

15. A flat type plasma a discharge display device as claimed in claim 5, wherein a dielectric layer is formed to cover an entire area of said discharge sustaining electrode group and address electrode group.

16. A flat type plasma a discharge display device as claimed in claim 5, wherein a dielectric layer is formed to cover an entire forming area of said discharge sustaining electrode group and address electrode group, and

When a thickness of the dielectric layer is taken as t and a distance between the discharge start address electrode of the plasma discharge part and a confronting discharge sustaining electrode is taken as d , selected is $2t < d$.

17. A flat type plasma a discharge display device as claimed in claim 5, wherein a dielectric layer is formed to cover an entire forming area of said discharge sustaining electrode group and address electrode group, and a surface layer smaller in work function than the dielectric layer and for lowering a discharge voltage is formed on said dielectric layer.

18. A flat type plasma a discharge display device as claimed in claim 5, wherein a dielectric layer is formed to cover an entire forming area of said discharge sustaining electrode group and address electrode group, and a surface layer

having a sputtering resistance property is formed on said dielectric layer.

19. A driving method of a flat type plasma a discharge display device in which a discharge sustaining electrode group arranging a plurality of discharge sustaining electrodes and an address electrode group arranging a plurality of address electrodes each having a discharge start address electrode are formed on a common substrate, said discharge sustaining electrodes and said address electrodes are disposed to intersect each other through an insulating layer, and a plurality of plasma discharge parts are formed for each discharge start address electrode,

wherein a target or intended display is performed by making a portion between a discharge start address electrode relating to a selected plasma discharge part and a discharge sustaining electrode in a discharge start state.

20. A driving method of a flat type plasma a discharge display device as claimed in claim 19, wherein upon performing the intended display,

as a driving method for forming one screen by first and second fields, in the first field, a display is made by a part of plasma discharge parts corresponding to each discharge start part, and

in the second field, a display is made by the other plasma discharge parts corresponding to each discharge start part.

21. A driving method of a flat type plasma a discharge display device as claimed in claim 19, wherein upon performing the intended display,

a display is made by driving and discharging a pair of plasma discharge parts formed by the discharge start parts at the same time.

22. A flat type plasma a discharge display device, wherein a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween,

a discharge sustaining electrode group formed by arranging a plurality of discharge sustaining electrodes is formed at said first substrate side,

an address electrode group formed by arranging a plurality of address electrodes is formed at said second substrate side,

a plurality of plasma discharge parts are formed in one discharge start part of said address electrodes, and

an interval between discharge sustaining electrodes forming a pair in discharge sustaining relating to said plasma discharge part is set at less than 50 μm , and a plasma discharge

display mainly by a cathode glow discharge is realized.

23. A flat type plasma a discharge display device as claimed in claim 22, wherein an interval between said address electrode and the corresponding discharge sustaining electrode is selected at equal to or more than 100 μm , and a discharge is started mainly by a negative glow discharge.

24. A flat type plasma a discharge display device as claimed in claim 22, wherein a gap shape between mutually confronting edges of a pair of discharge sustaining electrodes for composing said plasma discharge part is made as a pattern which is bent or curved in a width direction of said discharge sustaining electrode.

25. A flat type plasma a discharge display device as claimed in claim 22, wherein said discharge sustaining electrode is made of a good conductive and light-impermeable electrode.

26. A flat type plasma a discharge display device as claimed in claim 22, wherein one of the pair of discharge sustaining electrodes for composing the plurality of plasma discharge parts relating to one discharge start part is made of a good conductive and light-impermeable electrode.

27. A flat type plasma a discharge display device as claimed in claim 22, wherein one of the pair of discharge sustaining electrodes for composing the plurality of plasma discharge parts relating to one discharge start part is electrically connected to one of the other pair of the discharge sustaining electrodes.

28. A flat type plasma a discharge display device as claimed in claim 22, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group.

29. A flat type plasma a discharge display device as claimed in claim 22, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group, and a surface layer smaller in work function than the dielectric layer and for lowering the discharge voltage is formed on said dielectric layer.

30. A flat type plasma a discharge display device as claimed in claim 22, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group, and a surface layer having a sputtering resistance property is formed on said dielectric layer.

31. A driving method of a flat type plasma a discharge

plasma discharge part corresponding to each discharge start part.

33. A driving method of a flat type plasma a discharge display device as claimed in claim 31, wherein upon performing the intended display,

the intended display is made by driving and discharging a plurality of plasma discharge parts corresponding to the discharge start parts at the same time.

34. A flat type plasma a discharge display device, wherein a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween,

a discharge sustaining electrode group formed by arranging a plurality of discharge sustaining electrodes is formed at said first substrate side,

a plurality of partition walls extended in a direction intersecting with a main extending direction of said discharge sustaining electrodes while keeping a specified interval therebetween and an address electrode group arranging a plurality of address electrodes and formed on each one of said partition walls along the extending direction of said partition walls are formed at said second substrate side,

a plurality of plasma discharge parts are formed in one discharge start part of said address electrodes, and

an interval between discharge sustaining electrodes forming a pair in discharge sustaining relating to said plasma discharge part is set at less than 50 μm , and a plasma discharge display mainly by a cathode glow discharge is realized.

35. A flat type plasma a discharge display device as claimed in claim 34, wherein an interval between said address electrode and the corresponding discharge sustaining electrode is selected at less than 50 μm , and a discharge relating to the address electrode is started mainly by a cathode glow discharge.

36. A flat type plasma a discharge display device as claimed in claim 34, wherein a gap shape between mutually confronting edges of a pair of discharge sustaining electrodes for composing said plasma discharge part is made as a pattern which is bent or curved in a width direction of said discharge sustaining electrode.

37. A flat type plasma a discharge display device as claimed in claim 34, wherein said discharge sustaining electrodes are each made of a good conductive and light-impermeable electrode.

38. A flat type plasma a discharge display device as claimed in claim 34, wherein one of the pair of discharge

sustaining electrodes for composing a plurality of plasma discharge parts relating to one discharge start part is made of a good conductive and light-impermeable electrode.

39. A flat type plasma a discharge display device as claimed in claim 34, wherein one of the pair of discharge sustaining electrodes for composing a plurality of plasma discharge parts relating to one discharge start part is electrically connected to one of the other pair of the discharge sustaining electrodes.

40. A flat type plasma a discharge display device as claimed in claim 34, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group.

41. A flat type plasma a discharge display device as claimed in claim 34, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group, and a surface layer smaller in work function than the dielectric layer and for lowering a discharge voltage is formed on said dielectric layer.

42. A flat type plasma a discharge display device as claimed in claim 34, wherein a dielectric layer is formed on an entire area to cover said discharge sustaining electrode group,

and a surface layer having a sputtering resistance property is formed on said dielectric layer.

43. A driving method of a flat type plasma a discharge display device in which a first substrate and a second substrate are opposed to each other while keeping a specified interval therebetween, a discharge sustaining electrode group formed by arranging a plurality of discharge sustaining electrodes is formed at said first substrate side, a plurality of partition walls extended in a direction intersecting with a main extending direction of said discharge sustaining electrodes while keeping a specified interval therebetween and an address electrode group composed of a plurality of address electrodes arranged and formed on each one of said partition walls along the extending direction of said partition walls are formed at said second substrate side, a plurality of plasma discharge parts are formed in one discharge start part of said address electrodes, an interval between discharge sustaining electrodes forming a pair in discharge sustaining relating to said plasma discharge part is set at less than 50 μm , and a plasma discharge display mainly by a cathode glow discharge is realized,

wherein a target or intended display is made by making a portion between an address electrode relating to a selected plasma discharge part and a discharge sustaining electrode in a discharge start state.

44. A driving method of a flat type plasma a discharge display device as claimed in claim 43, wherein upon performing the intended display,

as a driving method for forming one screen by first and second fields, in the first field, a display is made by a part of plasma discharge parts corresponding to each discharge start part, and

in the second field, a display is made by the other plasma discharge parts corresponding to each discharge start part.

45. A driving method of a flat type plasma a discharge display device as claimed in claim 43, wherein upon performing the intended display,

the intended display is made by driving and discharging a plurality of plasma discharge parts corresponding to the discharge start parts at the same time.